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APPLYING VIDEO GAME MOTIVATION FOR CREATING ENGAGING EDUCATIONAL ACTIVITIES

Beniamin STECUŁA

Silesian University of Technology; beniamin.stecula@polsl.pl, ORCID: 0000-0002-5817-528X

Purpose: The aim of this article is to analyze students' preferences and motivations regarding video games and present ideas and opportunities to improve education.
Design/methodology/approach: The author conveyed a survey among students from the Silesian University of Technology and compared the results with data from more than 1.25 million gamers from all over the world.
Findings: Most students are very interested in virtual games and it presents the possibility to increase engagement in classes.
Research limitations/implications: Better results would be achieved if students from more faculties participated in the survey.
Practical implications: The author hopes that this article will inspire lecturers to use presented class ideas and come up with more creative and interactive tasks during lectures to better connect with the new generation of gamers and to make classes more engaging and educating.
Social implications: The author hopes that society will see the impact and usefulness that virtual games have in modern times and that it is a medium worthy of attention, cognition, and use.
Originality/value: The author saw an opportunity to improve education through the use of a large database of gaming preferences. This research paper is addressed to lecturers and gamers.

Keywords: game, motivation, player, student, education.

Category of the paper: Research paper.

1. Introduction

The video game market is developing intensively. Millions of people around the world play video games every second (Vigato, Babić, 2021). Esports has been growing at a great rate throughout the world and the gaming industry is predicted to continue to grow (Palma-Ruiz et al., 2022). The entertainment industry is developing at a very fast pace; new branches of the video games industry are being created, e.g., mobile games and virtual reality games, which are

introducing new unique solutions and mechanics each year (Stecuła, 2022). Over the years, the methods, ways, and techniques of playing video games have changed significantly. Players use various mobile devices to play on the go using a laptop, tablet, handheld console, or smartphone, which can also be used in education (Gao et al., 2020). In modern times, players can also play online cooperating or competing with other players from around the world in real time. The video game industry is very profitable and popular, but still little research has been undertaken on the subject of esports, as Young Hoon Kim mentions while presenting the possible direction of development (Kim et al., 2020).

Computer games are becoming a respected medium, which is the subject of many scientific dissertations and is used both in business, education (Dinis et al., 2017), and in mental health improvement (Xu et al., 2021). This was particularly noticeable during the Covid-19 pandemic, as online games allowed one to maintain social contacts (Chen, 2022).

Today, young people have a different lifestyle than previous generations. Modern man uses mobile devices, reacts to stimuli, and uses information and data that are provided to him in an instant. Therefore, companies compete with each other to get the attention of people. The modern young person uses very fast and short content and does not focus for long. Some students who go through the deluge of one-minute content may have problems concentrating on a long lecture lasting 3 hours (Faradis, Reksiana, 2022). Therefore, the subject of this article is an attempt to take into account the gaming motivation of modern man when conducting classes and to present ideas that can contribute to the development of modern teaching methods, thus increasing the attractiveness and efficiency of learning in a university.

This article is based on available findings obtained from the Quantic Foundry survey of more than 1.25 million players around the world, but in order to focus on students, I distributed similar survey among students of the Silesian University of Technology, thanks to which I obtained not only a comparison between students, but I also compared their results with the rest of the world.

2. Methods

2.1. Original survey

Thanks to my interest in the development of the video game market and research carried out on them, I found an interesting survey about the motivation of computer players and decided to use the publicly available results to conduct a similar study on students of the Silesian University of Technology (SUT). The original survey was created by Quantic Foundry and is available on their website (Quantic Foundry, 2023). After providing our basic personal data in the form of gender and age, we get 6 questions about our habits from playing virtual games,

i.e., computer, console, mobile, virtual reality games, and about our last favorite games played. Then we answer 16 questions in which we declare what is important to us in games, then there are 17 questions about what we enjoy in games, and finally we mark the answers to 7 questions about our game behavior. After completing the entire survey, we receive our type of player and percentage results, which means what percentage of players are less motivated by each of the 6 motivation groups. The division into motivation groups is as follows:

- Action.
- Social.
- Mastery.
- Achievement.
- Creativity.
- Immersion.

Each of these six groups consists of two secondary motivations presented in the table below (Table 1).

Table 1.
Motivations and secondary motivations

Motivation	**Secondary motivations**	
Action	Excitement	Destruction
Social	Competition	Community
Mastery	Challenge	Strategy
Achievement	Completion	Power
Creativity	Discovery	Design
Immersion	Fantasy	Story

Source: Own study.

Each secondary motivation has listed few representations among popular games (Quantic Foundry, 2023):

- Action:
  - Excitement: adrenaline rush in Halo, Street Fighter, or Injustice.
  - Destruction: eruptions in Call of Duty, or Battlefield.
- Social:
  - Competition: matches in Starcraft, or League of Legends.
  - Community: multiplayer in Portal 2, or Mario Kart.
- Mastery:
  - Challenge: practicing skills in Dark Souls.
  - Strategy: planning in XCOM, Civilization, or Europa Universalis.
- Achievement:
  - Completion: collecting costumed in World of Warcraft.
  - Power: acquiring powerful weapons in RPGs, or action games.

- Creativity:
  - Discovery: exploration in MMO, or MineCraft.
  - Design: customization in Mass Effect.
- Immersion:
  - Fantasy: immersion in Skyrim, Fallout, or Mass Effect.
  - Story: narration in The Last of Us, or BioShock.

In addition to the motivation profile, respondents also get a list of games that they may enjoy based on the results of their surveys.

2.2. Player game motivation research

Research on player motivation began as early as 2005 thanks to Nick Yee, who has founded Quantic Foundry and started intensively developing motivation concepts in 2015. His most cited work 'Motivations for Play in Online Games' was published already in year 2006 (Yee, 2006), and his work grew from data from 3000 MMORPG players to more than 1.25 million diverse players from all over the world as of year 2023. He published dozens of papers on video games, with the last publication 'Gamer motivation profiling: Uses and applications' released in 2018 (Yee, 2018). He has also tackled the subject of how games influence business and education in his book 'The Proteus paradox: How online games and virtual worlds change us-and how they don't' (Yee, 2014), which encourages learning from the game industry and inspires the improvement of education methods, which is closely related to the discussion of this conducted research.

To this day there have been many scientific publications based on his work. Many works such as 'Differences in students' stem identity, game play motivations, and game preferences' by Kathleen S. Jeremiassen were studying connections between STEM identity of students and game play motivations (Jeremiassen, 2018). Sofia Sabrini examines associations of those Gamer Types with narrative preferences (Sabarini, 2021). Based on the Quantic Foundry Survey, Matija Vigato and Tihana Babić conducted a survey on Algebra University College students (Vigato, Babić, 2021). A similar survey was also conducted on Australian Mobile Gamers (Greenwood et al., 2020).

2.3. Gamer Types

The original survey always returned one main Gamer Type, but when the responses were defining values of two Gamer Types, the secondary type was also presented. In my version of the survey, I was only asking about the primary result.

Here are the defining motivations of the 9 Gamer Types distinguished by Quantic Foundry (Quantic Foundry, 2023):

- Acrobat – challenge and discovery.
- Architect – strategy and completion.

- Bard – design, community and fantasy.
- Bounty Hunter – destruction and fantasy.
- Gardener – completion.
- Gladiator – challenge, completion and community.
- Ninja – competition and challenge.
- Skirmisher – destruction and competition.
- Slayer – fantasy, story and destruction.

The combination of the primary player type with the secondary type allows one to get 81 unique combinations of player types to be distinguished.

2.4. Created survey

To compare the motivation of SUT students with the rest of the world, I created my own survey, consisting of 10 close-end questions, to collect this information (Table 2):

- Gamer Type (answers: Acrobat, Architect, Bard, Bounty Hunter, Gardener, Gladiator, Ninja, Skirmisher, Slayer).
- Six questions about score in each main motivation category.
- How many days a week do you play for at least half an hour (answers: 0-1, 2-3, 4-5, 6-7).
- Gender (answers: Man, Woman).
- Age (answers: 0-17, 18-25, 26-35, 36-53, 54+).

Table 2.
Example of collected answers

Question	Answer
Gamer Type	Bounty Hunter
Action (%)	69
Social (%)	2
Mastery (%)	32
Achievement (%)	42
Creativity (%)	24
Immersion (%)	54
Days a week	6-7
Gender	Man
Age	26-35

Source: Own study.

Completing the created survey consists of solving the original Quantic Foundry survey (5-7 minutes) and answering the survey created by me using the percentage answers obtained in individual categories (3-5 minutes).

2.5. Survey population

The survey was created using Google Forms and sent to more than 220 students from a few classes of the Faculty of Applied Mathematics and the Faculty of Organization and Management to complete the survey during classes or at home. Therefore, 107 survey responses were obtained during a few months, from December 2022 to March 2023.

3. Results

3.1. Review and data correction

Blank fields have appeared in several responses; however, even if someone did not provide percentages of motivation, their answers were still used to study associations about Gamer Type, gender, and weekly frequency of play.

One survey was incorrectly filled out for a joke, where the percentage data exceeded 100. The other responses contained values in the range of 0-100. Some text fields required manual removal of the percent sign.

3.2. Examination of the form of the original quiz

To verify whether some respondents decided to answer all questions with a neutral value of the five-point scale (middle answer), I carried out such a simulation and obtained the values presented in Figure 1. As you can see, these are not 50% values because respondents most often answered the questions with positive motivation feedback. In two categories, the average answers gave very low scores, which means that players from all over the world highly value Immersion and Creativity in computer games.

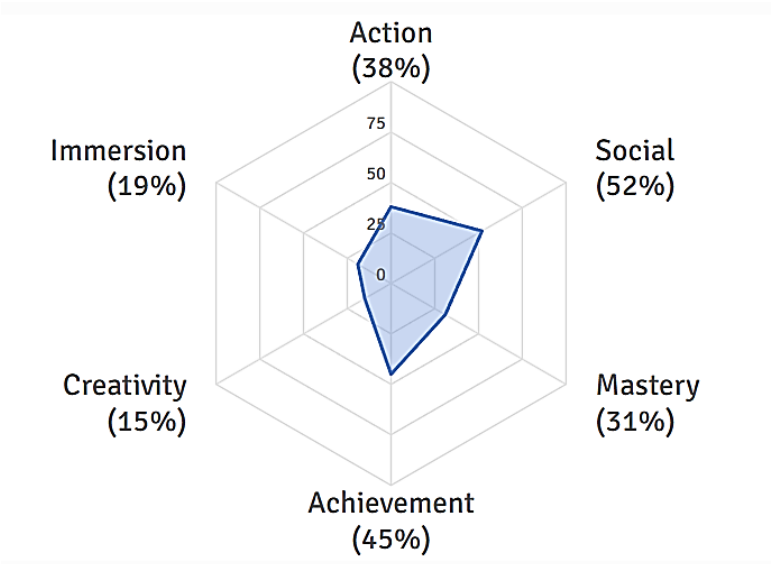

Figure 1. Scores obtained by choosing always the middle, neutral answer from the Quantic Foundry survey.

After reviewing the data that I obtained from the students, it turned out that I did not get such responses. I also did not get all the 0% or 100% answers anywhere. After such a verification of the data, the answers can be considered correct, so I used all the other data.

3.3. Motivation scores

The first analysis was to compare the motivation scores between the surveyed students, the male students, the female students, the global average score (always 50%) and the score obtained by giving neutral responses (Figure 2).

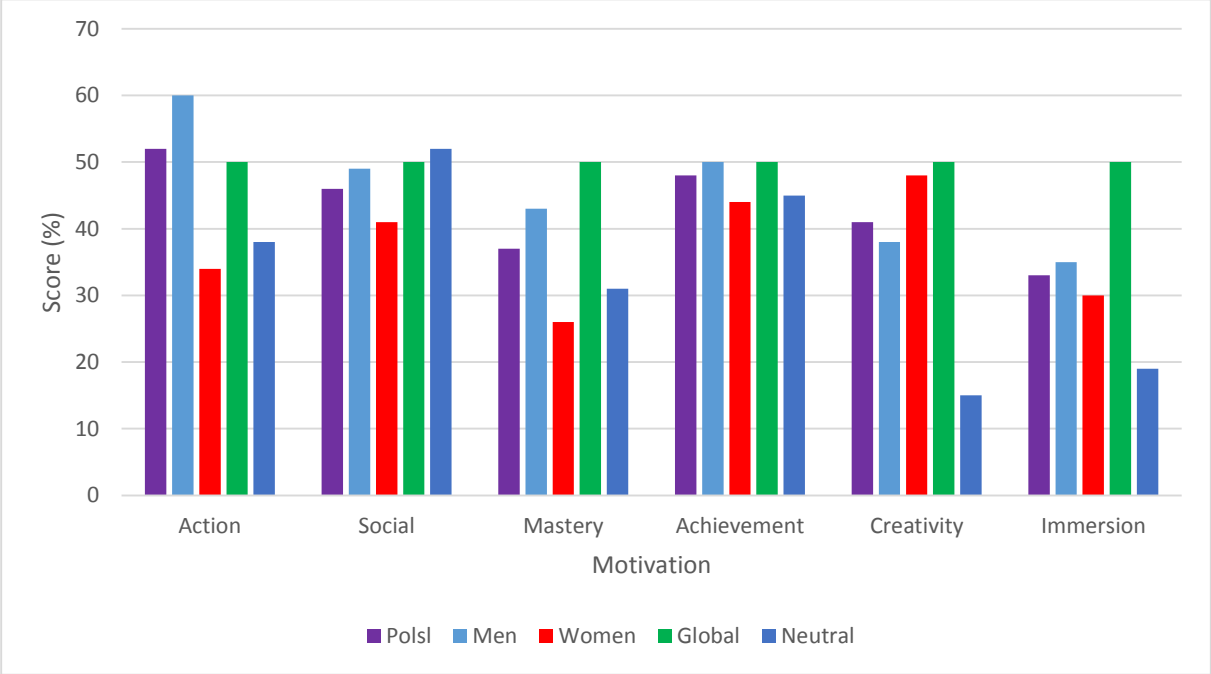

Figure 2. Comparison of motivation scores between surveyed students (n = 101), male students (n = 69), female students (n = 31), global median score (always 50%) and score obtained by giving neutral responses.

The comparison shows that our students are less motivated to play video games than the rest of the world in 5 out of 6 categories.

In Action I obtained diverse responses because that was the only category in which male students tended to score higher than the global average. Female students gave responses that were below neutral.

The Social category obtained results that suggest that there is a low motivation for both players from Silesian University of Technology and from all over the world, because that is the only category in which neutral responses gave a score that is above 50%.

In the Mastery and the Achievement categories, male students tended to respond similarly to the global average, and female students slightly less.

Despite obtaining in the last two categories scores lower than 50%, Silesian University of Technology students rated Creativity and Immersion as highly motivating (41% and 33%), which can be seen in comparison to neutral responses (15% and 19%) but less motivating compared to the rest of the world.

The next figure presents the correlation between motivation scores in each category with respect to weekly playing frequency (Figure 3).

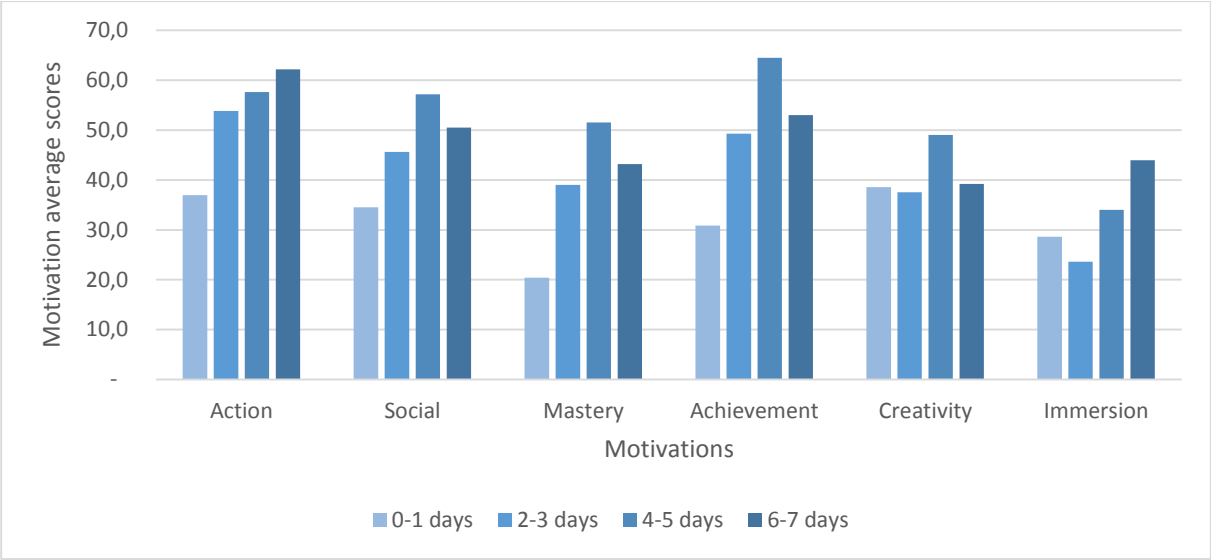

Figure 3. Comparison of motivation scores in regard to the number of days of play in a week.

It can be seen that in most categories the highest motivation scores occurred when playing 4 to 5 days a week, except for the Action and the Immersion category, where the highest motivation takes place when students play every day or almost every day.

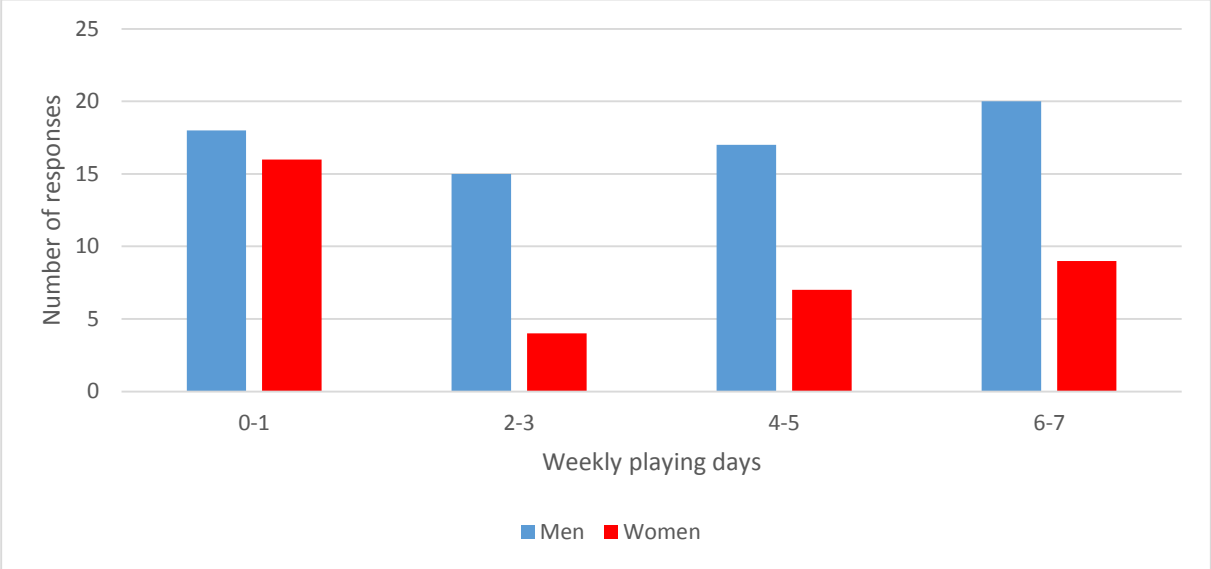

Figure 4. How often do students play video games per week broken down by gender.

It is also worth noting that many students tend to play very frequently or do not play at all, this can be seen especially among female students (Figure 4).

3.4. Gamer Types

Each set of unique motivation scores translates into one of nine types of player (Figure 5).

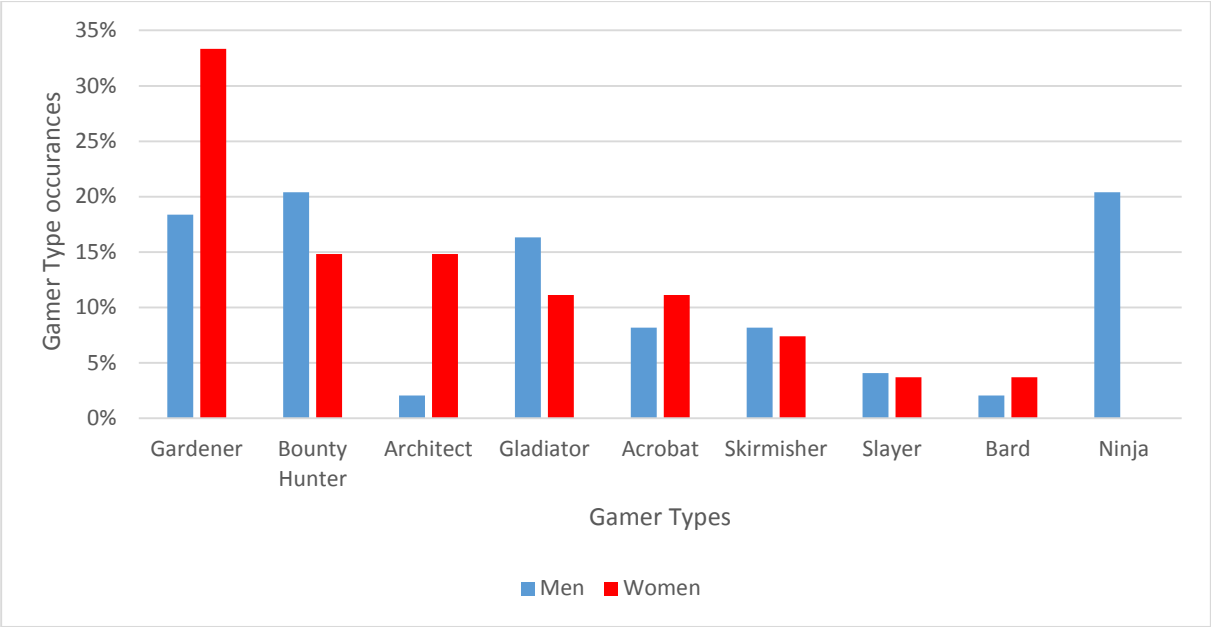

Figure 5. The Gamer Type frequency broken down by gender, sorted descending by the women scores.

The first observation is that female students have the highest agreement on choosing the most common category, which is the Gardener with a score of 33%, while the highest score among men is ex aequo the Ninja and the Bounty Hunter with a score of only 20%. Men group is more diverse because it obtained representants of all categories while among women there was no occurrences of the Ninja Gamer Type between all 34 responders.

The two biggest differences, beside named the Gardener Game Type, are shown on the example of the Ninja, which was the most frequent category among men compared to the least frequent category among women, and the Architect, which was the least popular among men and the second most popular among women.

4. Discussion

4.1. Survey improvement ideas

The survey in its current form can be considered a pilot study, which allowed to obtain an indicative, approximate picture of the issue against the background of the survey results. In the second version of the survey, more answers could be obtained from more departments, and additional questions on secondary motivations could be inserted, which will also allow you to verify the correctness of the entered data, because the value of the primary motivation score value must always be between two secondary motivation scores.

A Jotform survey (Jotform, 2023) could be used to make use of an analog scale in the form of a slider with values from 0 to 100, to make typing easier and so that you do not have to correct mistyped data, although then it will be more difficult to sift out data filled in for a joke.

One might consider discarding data with a lot of 0% responses for people not interested in games, because it is reasonable to assume that there were very few people not interested in games who filled out the original survey, which was dedicated specifically for enthusiast gamers.

You can also additionally verify and reject responses that contain suspicious features such as too many values divisible by 10. In the current version, they were not rejected because they could simply be explained by fair answers being rounded by the respondents, but next time one should ask such people to confirm the reason for filling data that way.

4.2. Global data

To obtain more precise and specific data, I have written a request for Quantic Foundry to share their survey data from over 1.25 million players, but I was refused on the grounds that their data is sold to gaming companies and cannot be published. However, the public data provided sufficient information to conduct this investigation.

4.3. Gamer Types

The most dominant secondary motivation among female students was the Completion. It was a dominant motivation in three out of four most popular Gamer Types (Gardener, Architect, and Gladiator). There was no such clear dominant secondary motivation among male students, but the Completion and the Challenge occurred twice in four most popular Gamer Types. Therefore, the potential way to increase motivation of students during classes may be by assigning students cognitive tasks which allow them to get improved repeatedly to obtain a flawless result. However, making use of the Challenge motivation discovery, it is recommended to give one subpoint or a special task that will be an additional challenge, which will allow students to collect additional points or allow them to gain some benefit of another kind, such as a free hint during the next test.

4.4. Ideas for harnessing video game solutions to conduct classes based on personal thoughts and experience

The author successfully introduced many modern and game-like activities to classes, which resulted in great popularity, interest, commitment, and positive reaction among students. The following are already tried and there are some new ideas which were inspired by the results obtained during this research. These ideas can be divided into 6 categories in relation to the motivation that contributed the most to the creation of the idea:

- Action – Adding surprising questions to increase concentration. To create a positive tension, the lecturer can make use of time-limited quizzes during tests or during casual activities using free tools like Kahoot or to give a point to the first person answering correctly to a given question. The Action motivation category presents the largest difference between the average score of male and female students. Men could

statistically be less stressed while the group focus is on them and they are in the center of the room. It is worth noting that a more shy person could feel aggrieved, so this should not be a main type of activity to gain points and grades.

- Social – Introducing group projects. Presenting exam preparation materials in the form of a list of topics that could be developed together by a group.
- Mastery – Encouraging correction of errors in submitted reports, documentation, and even tests and exams to practice and correct the mistakes made.
- Achievement – Including catchy questions on tests that encouraged careful reading and active thinking while solving it. Providing points for noticing errors. Adding a special, more difficult sub-point to let students differentiate themselves from the group, earn bonus points, grades, or a special profit such as a free hint during the next test or an allowance to postpone a homework assignment.
- Creativity – Introducing tasks that have no rigid rules and let students come up with their own topic regarded to the subject and develop it in the most interesting and creative way.
- Immersion – Interactive and colorful questions in various forms, such as dragging responses to fit the text. Using interactive online quizzes on Brilliant (Brilliant, 2023) that grant points for responding correctly, counting the daily learning streak, and congratulating on another day of learning. Many times, students voluntarily did not leave the class after the end because they did not finish the extra-compulsory courses, which may indicate high immersion.

In many video games, there is also a highly controversial topic discussed regarding the gambling aspect of loot boxes (Czerska, Majerska, 2023). It could be used to encourage students to optional activities, such as filling out an Education Quality Survey by rewarding one randomly selected participant with an additional point for the activity. However, this is not always recommended because not selected students may feel treated unfairly. The use of this method should be considered for each group individually.

5. Summary

Students of the SUT are highly interested in virtual games, but they have a slightly different average score in gaming motivation from the rest of the world.

The research required conducting a survey among students, an extensive review of the data to screen out the erroneous ones, analysis, and coming up with conclusions on the application of the acquired knowledge to improve the state of teaching at the SUT.

Data obtained during this research shows that students are highly engaged in virtual games thanks to six main motivations. The difference between male and female students was visible, but conducting a survey on a larger population would be advised. However, conducting a survey on students of the entire university of technology is a time-consuming and problematic task due to the fact that not all students are willing to fill in questionnaires. The next version of the survey could include questions about secondary motivations which will help to verify the correctness of the students' answers.

Motivations presented in this study can be easily adapted from the video game industry to education by conducting classes that let students become more engaged in many ways presented in the previous section. Some ideas were already introduced and have already received a positive response from students.

One can hope that thanks to more research conducted on computer games, it will be possible to continue raising the level of education at Polish universities.

Acknowledgments

Quantic Foundry created a professional survey that was used as a comparison to the results obtained from the students of SUT. Unfortunately, they did not want to share the private part of their data because their business model depends on selling this collected user data to companies that create computer games.

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